I claim:

1. A method for treating a disease or condition associated with the activity of a G protein coupled receptor (GPCR) comprising administering an inverse agonist for the GPCR to an organism with a disease or condition associated with the activity of the GPCR in a quantity and for a period that causes an increase in the population of GPCRs, either spontaneously active or those that are available and activated by an endogenous agonist or by an exogenous agonist, associated with that physiological function, thereby producing a therapeutic effect to ameliorate the disease or condition.

2. The method of claim 1 wherein the administration of the inverse agonist results in continuous levels of the inverse agonist in the bloodstream of the organism to which the inverse agonist is being administered.

3. The method of claim 1 wherein the disease or condition associated with the activity of a GPCR is a pulmonary airway disease.

4. The method of claim 3 wherein the pulmonary airway disease is asthma.

5. The method of claim 3 wherein the pulmonary airway disease is selected from the group consisting of allergic rhinitis, bronchiectasis, bronchitis, chronic obstructive pulmonary disease (COPD), Churg-Strauss syndrome, pulmonary sequelae of cystic fibrosis, emphysema, and pneumonia.

6. The method of claim 3 wherein the therapeutic effect is a reduction in pulmonary airway constriction hyperresponsiveness.

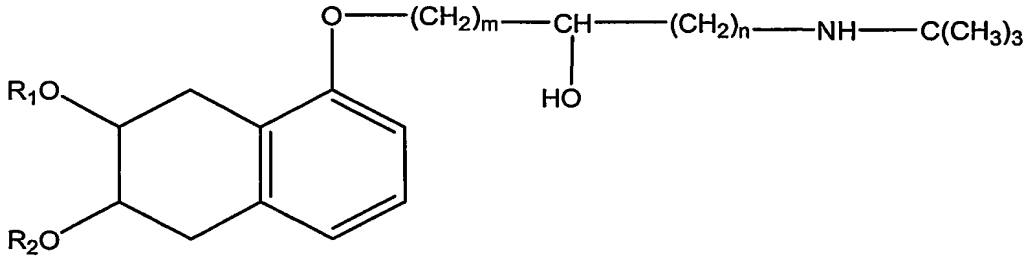
7. The method of claim 3 wherein the GPCR is a β_2-adrenergic receptor.

8. The method of claim 7 wherein the therapeutic effect is an upregulation of the population of pulmonary β_2-adrenergic receptors.

9. The method of claim 7 wherein the therapeutic effect is increased pulmonary airway relaxation responsiveness to β_2-adrenergic agonist drugs.

10. The method of claim 7 wherein the inverse agonist is selected from the group consisting of nadolol, bupranolol, butoxamine, carazolol, carvedilol, ICI-118,551, levobunolol, metoprolol, propranolol, sotalol, and timolol, and the salts, solvates, analogues, congeners, bioisosteres, hydrolysis products, metabolites, precursors, and prodrugs thereof.

11. The method of claim 10 wherein the β-adrenergic inverse agonist is selected from the group consisting of nadolol and a compound of formula (I)

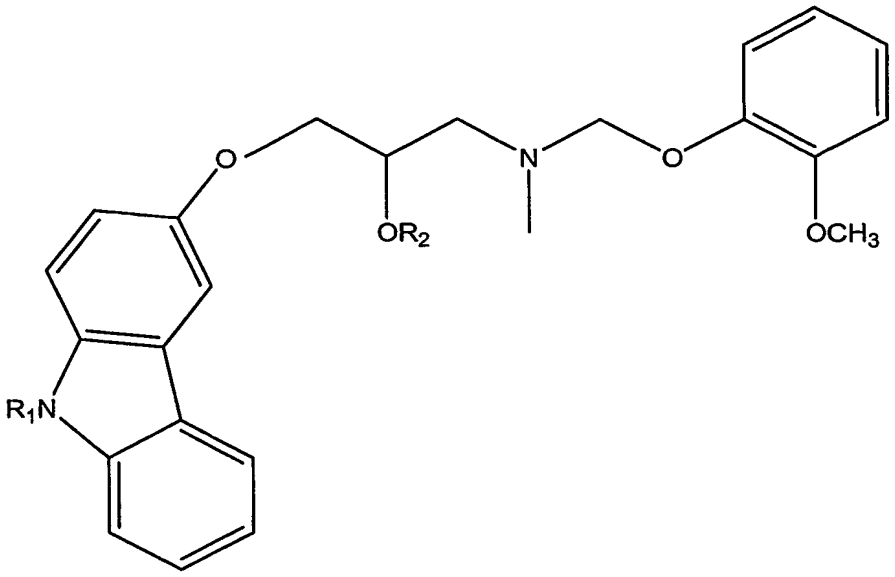


(I)

wherein R_1 is hydrogen or lower alkyl, R_2 is hydrogen or lower alkyl, and m and n are 1 to 3, with the proviso that where R_1 and R_2 are both hydrogen and m is 1, n is other than 1.

12. The method of claim 11 wherein the β-adrenergic inverse agonist is nadolol.

13. The method of claim 10 wherein the β-adrenergic inverse agonist is selected from the group consisting of carvedilol and a compound of formula (II)

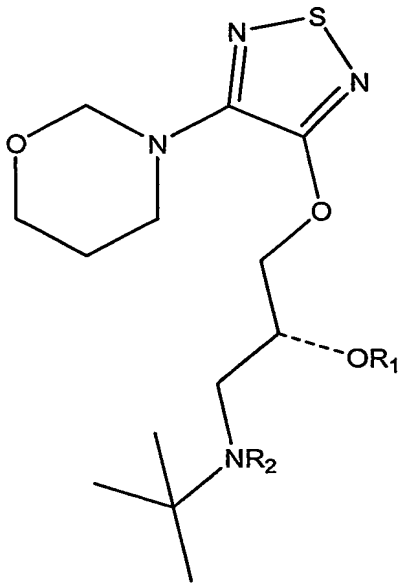


(II)

wherein R_1 is hydrogen or lower alkyl, R_2 is hydrogen or lower alkyl, and R_3 is hydrogen or lower alkyl, with the proviso that all of R_1, R_2, and R_3 are not all hydrogen.

14. The method of claim 13 wherein the β-adrenergic inverse agonist is carvedilol.

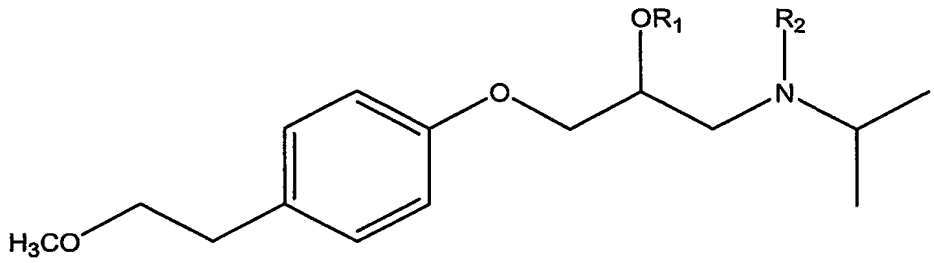
15. The method of claim 1 wherein the β-adrenergic agonist is selected from the group consisting of timolol and analogues of timolol of formula (III) wherein R_1 is hydrogen or lower alkyl and R_2 is hydrogen or lower alkyl, with the proviso that both R_1 and R_2 are not hydrogen.



(III)

16. The method of claim 15 wherein the β-adrenergic inverse agonist is timolol.

17. The method of claim 1 wherein the β-adrenergic agonist is selected from the group consisting of metoprolol and analogues of metoprolol of formula (IV) wherein R_1 is hydrogen or lower alkyl and R_2 is hydrogen or lower alkyl, with the proviso that both R_1 and R_2 are not hydrogen.



(IV)

18. The method of claim 17 wherein the β-adrenergic inverse agonist is metoprolol.

19. The method of claim 3 wherein the method further comprises the administration of an additional agent.

20. The method of claim 19 wherein the additional agent is a β_2-selective adrenergic agonist drug.

21. The method of claim 20 wherein the β_2-selective adrenergic agonist is selected from the group consisting of albuterol, bitolterol, clenbuterol, clorprenaline, dobutamine, fenoterol, formoterol, isoetharine, isoprenaline, levabuterol, mabuterol, metaproterenol, pirbuterol, ritodrine, salbutamol, salmeterol, terbutaline, and the salts, solvates, analogues, congeners, bioisosteres, hydrolysis products, metabolites, precursors, and prodrugs thereof.

22. The method of claim 19 wherein the additional agent is a steroid.

23. The method of claim 22 wherein the steroid is selected from the group consisting of beclomethasone, budenoside, ciclesonide, flunisolide, fluticasone, methylprednisolone, prednisolone, prednisone, and triamcinolone, and the salts, solvates, analogues, congeners, bioisosteres, hydrolysis products, metabolites, precursors, and prodrugs thereof.

24. The method of claim 19 wherein the additional agent is an anticholinergic drug.

25. The method of claim 24 wherein the anticholinergic drug is selected from the group consisting of ipratropium bromide, tiotropium bromide,

and oxitropium bromide, and the salts, solvates, analogues, congeners, bioisosteres, hydrolysis products, metabolites, precursors, and prodrugs thereof.

26. The method of claim 19 wherein the additional agent is a xanthine compound.

27. The method of claim 26 wherein the xanthine compound is selected from the group consisting of theophylline, extended-release theophylline, aminophylline, theobromine, enprofylline, diprophylline, isbufylline, choline theophyllinate, albifylline, arofylline, bamifylline and caffeine.

28. The method of claim 19 wherein the additional agent is an anti-IgE antibody.

29. The method of claim 28 wherein the anti-IgE antibody is a monoclonal antibody or a genetically engineered antibody that is derived from a monoclonal antibody.

30. The method of claim 29 wherein the anti-IgE antibody is humanized.

31. The method of claim 30 wherein the humanized antibody is an IgG1 κ monoclonal antibody.

32. The method of claim 31 wherein the IgG1 κ monoclonal antibody is omalizumab.

33. The method of claim 19 wherein the additional agent is a leukotriene modifier.

34. The method of claim 33 wherein the leukotriene modifier is selected from the group consisting of ibudilast, montelukast, pranlukast, and zafirlukast, and the salts, solvates, analogues, congeners, bioisosteres, hydrolysis products, metabolites, precursors, and prodrugs thereof.

35. The method of claim 19 wherein the additional agent is a phosphodiesterase IV inhibitor.

36. The method of claim 35 wherein the phosphodiesterase IV inhibitor is selected from the group consisting of roflumilast and cilomilast, and the salts, solvates, analogues, congeners, bioisosteres, hydrolysis products, metabolites, precursors, and prodrugs thereof.

37. The method of claim 1 wherein the disease or condition associated with the activity of a GPCR is congestive heart failure (CHF).

38. The method of claim 37 wherein the GPCR is a β_2-adrenergic receptor.

39. The method of claim 38 wherein the inverse agonist is nadolol.

40. The method of claim 1 wherein the GPCR is selected from the group consisting of acetylcholine receptors, α-adrenergic receptors, β_3-adrenergic receptors, serotonin (5-hydroxytryptamine) receptors, dopamine receptors, adenosine receptors, angiotensin Type II receptors, bradykinin receptors, calcitonin receptors, calcitonin gene-related receptors, cannabinoid receptors, cholecystokinin receptors, chemokine receptors, cytokine receptors, gastrin receptors, endothelin receptors, γ-aminobutyric acid (GABA) receptors, galanin receptors, glucagon receptors, glutamate receptors, luteinizing hormone receptors, choriogonadotrophin receptors, follicle-stimulating hormone receptors,

thyroid-stimulating hormone receptors, gonadotrophin-releasing hormone receptors, leukotriene receptors, Neuropeptide Y receptors, opioid receptors, parathyroid hormone receptors, platelet activating factor receptors, prostanoid (prostaglandin) receptors, somatostatin receptors, thyrotropin-releasing hormone receptors, vasopressin and oxytocin receptors.

41. The method of claim 40 further comprising administering an agonist to the GPCR.

42. A method for screening a compound for inverse agonist activity against a GCPR comprising the steps of:

(a) providing a population of specific G protein coupled receptors characterized by a constitutive basal level of activity in the absence of an agonist;

(b) contacting the population of specific G protein coupled receptors with a compound to be screened for its inverse agonist activity, the compound not being an agonist of the population of specific G protein coupled receptors; and

(c) determining the constitutive basal level of activity of the specific G protein coupled receptors in the absence of the compound and in the presence of the compound, such that the constitutive basal level of activity decreases if the compound is an inverse agonist.

43. The method of claim 42 wherein the level of activity of the specific G protein coupled receptors is determined in an intact organism.

44. The method of claim 42 wherein the level of activity of the specific G protein coupled receptors is determined in cell culture.

45. The method of claim 42 wherein the level of activity of the specific G protein coupled receptors is determined in tissue culture.

46. The method of claim 42 wherein the production or activity of a second messenger is measured.

47. The method of claim 46 wherein the second messenger is cAMP.

48. The method of claim 42 wherein a physiological consequence of receptor activation is measured.

49. The method of claim 48 wherein the physiological consequence of receptor activation is airway resistance.

50. The method of claim 42 wherein the population of specific G protein coupled receptors is provided in cells transformed or transfected with genetically engineered constitutively active mutant receptors.

51. The method of claim 42 wherein the population of specific G protein coupled receptors is provided in cells that overexpress wild-type receptors.

52. A method for screening a compound for inverse agonist activity against a GCPR comprising the steps of:

(a) providing cells containing a population of specific G protein coupled receptors characterized by a constitutive basal level of activity in the absence of an agonist;

(b) contacting the cells containing the population of specific G protein coupled receptors with a compound to be screened for its inverse agonist activity, the compound not being an agonist of the population of specific G protein coupled receptors, the compound being contacted with the cells for a

period of time to result in an increase in receptor population or receptor density if the compound is an inverse agonist; and

(c) determining the receptor population or receptor density of the specific G protein coupled receptors in the cells in the absence of the compound and in the presence of the compound, such that the receptor population or receptor density increases if the compound is an inverse agonist.

53. The method of claim 52 wherein the receptor population or receptor density is determined by an immunochemical method.

54. The method of claim 52 wherein the receptor population or receptor density is determined by binding of a radioligand with an affinity sufficiently high to bind all receptors and measuring the extent of binding.

55. A method for treating a disease or condition associated with the activity of a G protein coupled receptor (GPCR) comprising administering an inverse agonist for the GPCR to an organism with a disease or condition associated with the activity of the GPCR in a quantity and for a period that prevents the decrease in the population of GPCRs due to the presence of either exogenous or endogenous agonist, thereby producing a therapeutic effect to ameliorate the disease or condition.

56. A blister pack comprising:

(a) a lower substrate;

(b) an intermediate dosage holder that is shaped to generate a plurality of cavities and that is placed over the lower substrate, the cavities being shaped to hold dosage forms of an inverse agonist for a GPCR;

(c) an upper substrate placed over the intermediate dosage holder that has a plurality of apertures, each aperture being located to accommodate a corresponding cavity; wherein the dosage forms are of graduated dosages starting with a lowest dose and proceeding to a highest dose; and

(d) dosage forms of the inverse agonist for the GPCR placed in the cavities.

57. The blister pack of claim 56 wherein the GPCR is a β-adrenergic receptor.

58. The blister pack of claim 57 wherein the β-adrenergic receptor is a β_2-adrenergic receptor.

59. The blister pack of claim 56 wherein the GPCR is selected from the group consisting of acetylcholine receptors, α-adrenergic receptors, β_3-adrenergic receptors, serotonin (5-hydroxytryptamine) receptors, dopamine receptors, adenosine receptors, angiotensin Type II receptors, bradykinin receptors, calcitonin receptors, calcitonin gene-related receptors, cannabinoid receptors, cholecystokinin receptors, chemokine receptors, cytokine receptors, gastrin receptors, endothelin receptors, γ-aminobutyric acid (GABA) receptors, galanin receptors, glucagon receptors, glutamate receptors, luteinizing hormone receptors, choriogonadotrophin receptors, follicle-stimulating hormone receptors, thyroid-stimulating hormone receptors, gonadotrophin-releasing hormone receptors, leukotriene receptors, Neuropeptide Y receptors, opioid receptors, parathyroid hormone receptors, platelet activating factor receptors, prostanoid (prostaglandin) receptors, somatostatin receptors, thyrotropin-releasing hormone receptors, vasopressin and oxytocin receptors.

60. A pharmaceutical composition comprising:

(a) a therapeutically effective amount of an inverse agonist for a GPCR;

(b) a therapeutically effective amount of a second therapeutic agent, the second therapeutic agent being selected from the group consisting of a β_2-selective adrenergic agonist, a steroid, an anticholinergic drug, a xanthine

compound, an anti-IgE antibody, a leukotriene modifier, and a phosphodiesterase IV inhibitor; and

(c) a pharmaceutically acceptable carrier.

61. The pharmaceutical composition of claim 60 wherein the GPCR is a β-adrenergic receptor.

62. The pharmaceutical composition of claim 61 wherein the β-adrenergic receptor is a β_2-adrenergic receptor.

63. The pharmaceutical composition of claim 59 wherein the GPCR is selected from the group consisting of acetylcholine receptors, α-adrenergic receptors, β_3-adrenergic receptors, serotonin (5-hydroxytryptamine) receptors, dopamine receptors, adenosine receptors, angiotensin Type II receptors, bradykinin receptors, calcitonin receptors, calcitonin gene-related receptors, cannabinoid receptors, cholecystokinin receptors, chemokine receptors, cytokine receptors, gastrin receptors, endothelin receptors, γ-aminobutyric acid (GABA) receptors, galanin receptors, glucagon receptors, glutamate receptors, luteinizing hormone receptors, choriogonadotrophin receptors, follicle-stimulating hormone receptors, thyroid-stimulating hormone receptors, gonadotrophin-releasing hormone receptors, leukotriene receptors, Neuropeptide Y receptors, opioid receptors, parathyroid hormone receptors, platelet activating factor receptors, prostanoid (prostaglandin) receptors, somatostatin receptors, thyrotropin-releasing hormone receptors, vasopressin and oxytocin receptors.

64. A blister pack comprising:

(a) a lower substrate;

(b) an intermediate dosage holder that is shaped to generate a plurality of cavities and that is placed over the lower substrate, the cavities being shaped to hold dosage forms of the pharmaceutical composition of claim 69;

(c) an upper substrate placed over the intermediate dosage holder that has a plurality of apertures, each aperture being located to accommodate a corresponding cavity; and

(d) dosage forms of the pharmaceutical composition placed in the cavities.

65. The blister pack of claim 64 wherein the dosage forms of the pharmaceutical composition include graduated dosages of the inverse agonist of the pharmaceutical composition starting with a lowest dose of the inverse agonist and proceeding to a highest dose of the inverse agonist.

66. A blister pack comprising:

(a) a lower substrate;

(b) an intermediate dosage holder that is shaped to generate a plurality of cavities and that is placed over the lower substrate, the cavities being shaped to hold dosage forms of: (i) a first pharmaceutical composition that comprises: (A) a therapeutically effective amount of an inverse agonist for a GPCR; and (B) a first pharmaceutically acceptable carrier; and (ii) a second pharmaceutical composition that comprises: (A) a therapeutically effective amount of a second therapeutic agent, the second therapeutic agent being selected from the group consisting of a β_2-selective adrenergic agonist, a steroid, an anticholinergic drug, a xanthine compound, an anti-IgE antibody, a leukotriene modifier, and a phosphodiesterase IV inhibitor; and (B) a second pharmaceutically acceptable carrier;

(c) an upper substrate placed over the intermediate dosage holder that has a plurality of apertures, each aperture being located to accommodate a corresponding cavity; and

(d) dosage forms of the first and second pharmaceutical compositions placed in the cavities.

67. The blister pack of claim 66 wherein the dosage forms of the first pharmaceutical composition include graduated dosages of the inverse agonist of the first pharmaceutical composition starting with a lowest dose of the inverse agonist and proceeding to a highest dose of the inverse agonist.